REMARKS/ARGUMENTS

Claims 1-15 are currently pending in this application. Claims 7, 10 and 12 are amended herein. Claims 1, 6, and 15 were previously amended. Claim 9 is canceled by this Amendment. All the remaining claims are original and are unchanged from their original filing.

Teleconference with the Examiner

On September 23, 2004 attorney for the Applicants have a telephone conference with Examiner Hartman in which the claims were discussed. No agreement was reached regarding the substantive rejections of the claims based on Wu and Ejima. Agreement was reached regarding the Examiner's objections to claims 1, 6, 7, 9, 10, and 12.

Objections to the Claims

The Examiner objected to claim 1 as "confusing". No statutory or regulatory grounds for this objection are given. To the extent the Examiner believes one of ordinary skill would not understand the claim, or based upon the claim know how to make or use the invention, the applicants note that the Examiner understood claim 1 enough to cite Wu against claim 1. In the September 23, 2004 teleconference, the Examiner indicated he would withdraw his objection to claim 1.

The Examiner objected to claim 3 under 37 CFR 1.75 (c) as being of improper dependent form for failing to further limit the subject matter of the previous claim. The applicants respectfully traverse the Examiner's objection to the claim. Claim 1 is broad enough to encompass both claim 2 and claim 3, as the Examiner recognizes. The Examiner also recognizes that claims 2 and 3 are mutually exclusive. Since claim 3 excludes claim 2 and vice versa, both claim 2 and claim 3 are narrower than claim 1 and

are not co-extensive with each other. They are both narrower than claim 1. They are both allowable.

The Examiner objected to claim 5 under 37 CFR 1.75 (c) as being of "improper dependent form for failing to further limit the subject matter of a previous claim". The Applicants respectfully traverse the Examiner's objection to the claim. Claim 1 recites "scaling the points of inflection of a fuzzy logic membership function proportional to the standard deviation". Claim 5 recites, "multiplying a plurality of points of inflection of the fuzzy logic membership function by the standard deviation." These two sentences are not identical in scope. One relates to "scaling" generally. The other specifically describes a process of "multiplying" at least two values ("plurality") by a specific value ("standard deviation").

The Examiner objected to claim 6 because "it does not adequately explain how the sensor's validity is actually determined." Claim 6 is not directed to determining "validity", however, and at least for this reason the Applicants request that the Examiner withdraw his objection to the claim. In the teleconference of September 23, 2004, the Examiner stated that he was willing to withdraw his objection to claim 6.

The Examiner objected to claim 7 using the word "foregoing", which he described as an "unnecessary" element. Whether an element is "unnecessary" or not is not a proper statutory or regulatory ground for objection or rejection. The Applicants have deleted "foregoing" from claim 7 as a favor to the Examiner and pursuant to the teleconference of September 23, 2004. Since claim 7 was never rejected or objected to for any statutory or regulatory reasons, this amendment does not limit any scope of equivalents of claim 7.

The Examiner objected to claim 9 as being "replete with the same deficiencies as set forth by way of claim 1 above." The deficiencies identified by the Examiner regarding claim 1 are inapplicable to claim 9, since claim 9 does not use the same

language as claim 1. In the teleconference of September 23, 2004, the Examiner stated that he would withdraw his objection to claim 9.

The Examiner objected to claim 10 because "' the collective degree of scatter' and ' the individual degree of differences' lack proper antecedent basis." Applicants have amended claim 10 to include all limitations of parent claim 9 and a further amended claim 10 to recite, "a collective degree of scatter of the individual degrees of difference determined in step b" as a favor to the Examiner and pursuant to the teleconference of September 23, 2004. Since claim 10 was never rejected or objected to for statutory or regulatory reasons, this amendment does not limit any scope of equivalents of claim 10.

The Examiner objected to claim 12 because "' prior degrees of difference' lacks proper antecedent basis." The Applicants traverse the Examiner's objection to the claim. The Applicants indicated that the degrees of difference mentioned in claim 12 did appear previously are prior in the claim in "step b", as the claim recites. This was an expression of the existence of an antecedent. As a courtesy, the Applicants have amended claim 12 to move the word "prior" closer to the end of the sentence. This change is made as a favor to the Examiner and as a result of the teleconference of September 23, 2004. Again, we note that the Examiner made no statutory or regulatory objection to claim 12. For this reason, repositioning the word "prior" in claim 12 does not constitute an amendment that limits the scope of equivalents of the claim.

Rejections of the Claims under Section 102

In paragraph 4 of the Office Action, the Examiner rejected claim 9 under 35 USC 102 as the anticipated by Wu (US patent number 5,758,025). The Applicants have canceled claim 9, and this rejection is moot.

Rejections of the Claims under Section 103

In paragraph 5 of the Office Action, the Examiner rejected claims 1-5 and 10 under 35 USC 103 as being unpatentable over Wu (US patent number 5,758,025) in view of Ejima et al. (US patent number 5,526,467). The applicants respectfully traverse the Examiner's rejection of claims 1-5 and 10.

Wu is directed to a Dynamically Adaptive Fuzzy Interval Controller. Wu improves upon prior art fuzzy logic controllers (shown in Wu, Figures 1-2) with an improved controller shown in figures 3-9. Wu rejects the prior art controller of Figures 1-2 as inadequate since it does not permit dynamic and adaptive change of fuzzy intervals. "Fuzzy intervals" refer to the membership functions of the prior art fuzzifier 10 and defuzzifier 12.

Wu proposes providing a performance optimizer 15 that changes the input fuzzy gain, changes output fuzzy gain, and provides revised membership functions in the fuzzifier and the defuzzifier.

Performance optimizer 15 generates an input fuzzy gain (IFG), and output fuzzy gain (OFG), calculates a sensitivity index (lambda), and uses that sensitivity index to calculate revised membership functions for fuzzifier 10 and defuzzifier 12.

Wu says that the sensitivity index is a new parameter that determines the width, skewness, and positions of the membership functions (column nine, lines 38 --40). The sensitivity index may be set to any arbitrary value (column 10, lines 8-10) or it may be automatically adjusted on each cycle of the control algorithm, such as by multiplying it or dividing it by two (column 10, lines 10-14).

The reason to have a sensitivity index that alters the membership functions according to the equations provided in Wu is to permit the operator to increase or decrease system damping (column 10, lines 17-19).

Ejima is directed to a Membership Function Data Preparation Method and an Apparatus Thereof and an Adaptation Degree Operation Method and an Apparatus Thereof. In other words, Ejima is directed to a system and method for creating membership functions.

The problem that Ejima solves is the excessive memory storage required for high-resolution membership functions by reducing the memory required. (Abstract). "High-resolution" membership functions are those that (apparently) have very refined profiles that can only be described by many data points. The higher the accuracy of the membership functions (and the higher the resolution necessary to provide that accuracy), the greater the memory storage required for the various data points.

Throughout the Ejima disclosure, triangular membership functions are used for ease of illustration. Right at the end of the detailed description, and just before the claims, Ejima suggests a different shape to membership functions. Perhaps seeking to expand the scope of the claims, Ejima explains, "though membership functions are set as a triangle shape in this embodiment, they may be modified to be expressed by Gaussian distribution (normal distribution) functions as shown in FIG. 8. In this modification, a parameter for providing a shape preferably employs a standard deviation [sigma]" (column six, lines 22-38).

Ejima teaches a specific shape and spacing of Bell Curve membership functions, which he shows in Figure 8. Ejima says nothing more about the Gaussian or Bell Curve shape of his fuzzy membership functions. He does not explain where sigma comes from.

The Applicants note that all Gaussian curves are defined by a standard distribution usually written as sigma.

Following his single paragraph reference to Gaussian curves, Ejima provides another lone paragraph recommending trapezoidal membership functions as yet another alternative shape. Ejima again gives no reason to use trapezoidal membership functions versus triangle membership functions or Gaussian membership functions. He merely proposes those general shapes as possible alternatives for triangles.

Claim 1:

First, Wu does not disclose or suggest "calculating a standard deviation of the difference ... between the sensor signal and the estimated sensor signal" as recited in claim one. Wu explains how he uses his error signal in Column 11 and in Figure 9. He does not mention a "standard deviation".

Second, Ejima says absolutely nothing about sensor signals, estimated sensor signals, differences between sensor signals and estimated sensor signals, or standard deviations of these differences. All Ejima does is state that Gaussian curves are nice shapes for membership functions. He notes the obvious: that Gaussian curves are defined by "standard deviations" or sigmas. Ejima also likes triangular shapes and trapezoidal shapes for membership functions. Again, he provides no reason for making membership functions in any particular shape.

Third, Wu and Ejima cannot be combined. Ejima likes a nice Gaussian shapes for his membership functions. Wu goes into detail about the specific way in which his membership functions are created and revised. Indeed, Wu identifies this process of creating and revising his membership functions and fuzzy gains as the "key" to his "entire invention" (column 10, lines 39-42). Wu teaches against using an Ejima-style Bell curve

or Gaussian shape (with its inherent standard deviation or sigma). Using an Ejima-style Gaussian curve would not produce membership functions that looked like Wu's membership functions or are calculated like Wu's membership functions. The combination of Wu and Ejima in the manner suggested by the Examiner would change the fundamental mode of operation of the Wu control system and would deny the user all the advantages of the Wu system.

For at least the above reasons, the applicants respectfully request that the Examiner withdraw his rejection of claim 1 based on Wu and Ejima under 35 USC 103.

The Applicants further request that the Examiner withdraw his rejection of claims 2-5 as dependent upon claim 1, which Applicants believe is an allowable claim.

Claim 10:

Regarding claim 10, the Examiner stated that "Wu does not specifically teach the determination of scatter. Ejima teaches the use of a standard deviation, which is known in the art to represent the amount or degree of scatter, and is used for scaling a membership function (e.g. C6 L22-38)."

First, Wu and Ejima cannot be combined. This was explained above with regard to claim 1.

Second, Ejima does not teach calculating a value indicative of a collective degree of scatter of the individual degrees of difference [see cl. 10] ... between the sensor value and an estimated sensor value of the sensor [see cl. 9]"

While Ejima does teach Gaussian shaped membership functions (which inherently have a standard deviation and which the Examiner states is a "degree of scatter"), Ejima

is utterly silent on how those membership functions are derived. Apparently, Ejima just likes the curvy shape of Gaussian functions.

For at least the above reasons, the applicants respectfully request that the Examiner withdraw his rejection of claim 10 based on Wu and Ejima under 35 USC 103.

Amendments to the Claims

Several minor amendments to the claims have been discussed above. As minor courtesy amendments, not made in response to any statutory a regulatory objection to the claims, they are not believed to change the scope of the claims or to add new matter.

Claim 10 has been amended, but not in substance. The scope of claim 10 after amendment is the same as the scope of claim 10 before amendment. Claim 10 has been amended by incorporating the limitations of its parent claim, claim 9, to place it in independent form. No new matter has been added to claim 10. Since the scope of claim 10 has not changed, and the applicants have not made substantive amendments to distinguish claim 10 over the prior art, claim 10 retains its original scope of equivalents.

Conclusion

We believe the claims are in condition for allowance. If a telephone call would advance the prosecution of the case, the Examiner is cordially invited to contact the undersigned attorney for the applicants.

Respectfully submitted,

PATTON IP,

Dated: ___September 29, 2004_____ By _____

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